

IN THE CLAIMS ✓ ✓

Amend claims 1-19 as follows:

1. (Amended) A process for detecting the phenomenon of fluorescence in a microscope, comprising the steps of:

irradiating a sample by at least one of a modulated and a pulsed laser light source so as to produce fluorescence, and

detecting the fluorescence with a detector having variable phase positions, at least in two different phase positions of the detector.

2. (Amended) The process, as claimed in claim 1, further comprising the step of generating an image for each phase position using a signal output by the detector.

3. (Amended) The process, as claimed in claim 2, further comprising the step of displaying the image generated for each phase position on a monitor.

4. (Amended) The process, as claimed in claim 1, wherein said steps of irradiating and detecting are carried out using a laser scanning microscope.

5. (Amended) The process, as claimed in claim 1, wherein said detecting step is carried out using a modulatable PMT as the detector.

6. (Amended) A process for detecting the phenomenon of fluorescence in a microscope, comprising the steps of:

irradiating a sample using at least one of a modulated and a pulsed laser light source so as to produce fluorescence,

multiplying a reference signal, corresponding to the at least one of the modulated and pulsed laser, and a measurement signal, corresponding to a modulated detection of the fluorescence, together with a fixed variable phase relation to obtain a result; and

using the result to display an image.

7. (Amended) The process, as claimed in claim 6, wherein the phase relation between the reference signal and the measurement signal is adjusted in such a manner that the phase shift is zero.

8. (Amended) The process, as claimed in claim 6, wherein said detecting step is carried out using non-descanned detection.

9. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using multiphoton excitation of fluorescence emission.

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10. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a cw laser, modulated by means of an acousto-optical modulator (AOM).
11. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a cw laser, modulated by means of a Pockel cell.
12. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a pulse laser, which is additionally modulated.
13. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a pulse laser, which is additionally modulated by means of an acousto-optical modulator.
14. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a pulse laser, which is additionally modulated by means of a Pockel cell.
15. (Amended) The process, as claimed in claim 1, wherein said detecting step is carried out using time resolution and wherein said irradiating step is carried out using a multiphoton process.

16. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a pulsed near infrared laser.

17. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a pulsed near infrared laser, and further comprising the step of:

converting the frequency of the laser downstream to 1 photon excitation.

18. (Amended) The process, as claimed in claim 1, wherein said irradiating step is carried out using a pulsed near infrared laser, and further comprising the step of:

converting the frequency of the laser downstream to 1 photon excitation of

fluorescence.

19. (Amended) The process, as claimed in claim 1, wherein said detecting step is carried out using phase sensitive detection for improving the signal to noise ratio.

Please add the following new claims 20-38:

20. (New) The process, as claimed in claim 2, further comprising the step of carrying out a mathematical algorithm on the image to produce another image.

21. (New) The process, as claimed in claim 7, wherein said detecting step is carried out using non-descanned detection.

22. (New) The process, as claimed in claim 1, wherein said irradiating step is carried out using two photon excitation.

23. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using multiphoton excitation of fluorescence emission.

24. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using two photon excitation.

25. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a cw laser, modulated by means of an acousto-optical modulator.

26. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a cw laser, modulated by means of a Pockel cell.

27. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a pulse laser, which is additionally modulated.

28. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a pulse laser, which is additionally modulated by means of an acousto-optical modulator.

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29. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a pulse laser, which is additionally modulated by means of a Pockel cell.

30. (New) The process, as claimed in claim 15, wherein in said irradiating step, the multiphoton process is second harmonic generation on surfaces.

31. (New) The process, as claimed in claim 15, wherein in said irradiating step, the multiphoton process is two photon excitation.

32. (New) The process, as claimed in claim 6, wherein said detecting step is carried out using time resolution and wherein said irradiating step is carried out using a multiphoton process.

33. (New) The process, as claimed in claim 32, wherein in said irradiating step, the multiphoton process is second harmonic generation on surfaces.

34. (New) The process, as claimed in claim 32, wherein in said irradiating step, the multiphoton process is two photon excitation.

35. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a pulsed near infrared laser.

36. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a pulsed near infrared laser, and further comprising the step of:

converting the frequency of the laser downstream to 1 photon excitation.

37. (New) The process, as claimed in claim 6, wherein said irradiating step is carried out using a pulsed near infrared laser, and further comprising the step of:

converting the frequency of the laser downstream to 1 photon excitation of fluorescence.

38. (New) The process, as claimed in claim 6, wherein said detecting step is carried out using phase sensitive detection for improving the signal to noise ratio.